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Docket No.: NHL-SCT-21 US  
Serial No.: 09/758,903

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

EXAMINER: (NOT YET RECEIVED)  
ART UNIT: 1755  
SERIAL NO.: 09/758,903  
FILING DATE: January 11, 2001  
INVENTORS: Ulrich PEUCHERT and Peter BRIX  
TITLE: ALKALI-FREE ALUMINOBOROSILICATE GLASS, AND USES THEREOF

Greensburg, Pennsylvania 15601

Assistant Commissioner for Patents  
Washington, D.C. 20231

May 30, 2001

BOX MISSING PARTS

PRELIMINARY AMENDMENT

Sir:

Please enter the following Preliminary Amendment in order to place the claims of the above-cited application in better condition for examination.

In the Claims:

The following is a clean copy of all currently pending claims, that is, Claims 1-10, including the amendments to the claims made by the instant Preliminary Amendment.

1. An alkali-free aluminoborosilicate glass having a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.8 \times 10^{-6}/K$ , which has the following composition (in % by weight, based on oxide):

SiO <sub>2</sub>	> 58 - 65
B <sub>2</sub> O <sub>3</sub>	> 6 - 11.5

Al <sub>2</sub> O <sub>3</sub>	> 14 - 25
MgO	4 - 8
CaO	0 - 8
SrO	2.6 - < 4
BaO	0 - < 0.5
with SrO + BaO	> 3
ZnO	0 - 2.

2. An alkali-free aluminoborosilicate glass having a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.4 \times 10^{-6}/K$ , which has the following composition (in % by weight, based on oxide):

SiO <sub>2</sub>	> 58 - 65
B <sub>2</sub> O <sub>3</sub>	> 6 - 11.5
Al <sub>2</sub> O <sub>3</sub>	> 14 - 25
MgO	4 - 8
CaO	0 - < 2
SrO	> 0.5 - < 4
BaO	0 - < 0.5
ZnO	0 - 2.

3. An alkali-free aluminoborosilicate glass having a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.6 \times 10^{-6}/K$ , which has the following composition (in % by weight, based on oxide):

SiO <sub>2</sub>	> 58 - 65
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$B_2O_3$	> 6 - 11.5
$Al_2O_3$	> 21 - 25
MgO	4 - 8
CaO	0 - 8
SrO	2.6 - < 8
BaO	0 - < 0.5
with SrO + BaO	> 3
ZnO	0 - 2.

4. (Amended) The aluminoborosilicate glass according to Claim 1, characterized in that it comprises more than 18% by weight, preferably at least 20.5% by weight, particularly preferably at least 21% by weight, of  $Al_2O_3$ .

5. (Amended) The aluminoborosilicate glass according to Claim 1, characterized in that the glass comprises more than 8% by weight of  $B_2O_3$ .

6. (Amended) The aluminoborosilicate glass according to Claim 1, characterized in that it additionally comprises:

$ZrO_2$	0 - 2
$TiO_2$	0 - 2
with $ZrO_2$ + $TiO_2$	0 - 2
$As_2O_3$	0 - 1.5
$Sb_2O_3$	0 - 1.5
$SnO_2$	0 - 1.5
$CeO_2$	0 - 1.5

Cl <sup>-</sup>	0 - 1.5
F <sup>-</sup>	0 - 1.5
SO <sub>4</sub> <sup>2-</sup>	0 - 1.5
with As <sub>2</sub> O <sub>3</sub> + Sb <sub>2</sub> O <sub>3</sub> + SnO <sub>2</sub> + CeO <sub>2</sub>	
+ Cl <sup>-</sup> + F <sup>-</sup> + SO <sub>4</sub> <sup>2-</sup>	0 - 1.5.

7. (Amended) The aluminoborosilicate glass according to Claim 1, characterized in that the glass is free of arsenic oxide and antimony oxide, apart from unavoidable impurities, and that it can be produced in a float plant.

8. (Amended) The aluminoborosilicate glass according to Claim 1, which has a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.6 \times 10^{-6}/K$ , a glass transition temperature  $T_g$  of  $> 700^\circ C$  and a density  $\rho$  of  $< 2.600 \text{ g/cm}^3$ .

9. (Amended) Use of the aluminoborosilicate glass according to Claim 1 as substrate glass in display technology.

10. (Amended) Use of the aluminoborosilicate glass according to Claim 1 as substrate glass in thin-film photovoltaics.

Please add the following newly presented Claims 11-20.

--11. The aluminoborosilicate glass according to Claim 2, characterized in that it comprises more than 18% by weight, preferably at least 20.5% by weight, particularly preferably at least 21% by weight, of Al<sub>2</sub>O<sub>3</sub>.

12. The aluminoborosilicate glass according to Claim 2, characterized in that the glass comprises more than 8% by weight

of  $B_2O_3$ .

13. The aluminoborosilicate glass according to Claim 2, characterized in that it additionally comprises:

$ZrO_2$	0 - 2
$TiO_2$	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
$As_2O_3$	0 - 1.5
$Sb_2O_3$	0 - 1.5
$SnO_2$	0 - 1.5
$CeO_2$	0 - 1.5
$Cl^-$	0 - 1.5
$F^-$	0 - 1.5
$SO_4^{2-}$	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	0 - 1.5.

14. The aluminoborosilicate glass according to Claim 2, characterized in that the glass is free of arsenic oxide and antimony oxide, apart from unavoidable impurities, and that it can be produced in a float plant.

15. The aluminoborosilicate glass according to Claim 2, which has a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.6 \times 10^{-6}/K$ , a glass transition temperature  $T_g$  of  $> 700^\circ C$  and a density  $\rho$  of  $< 2.600 \text{ g/cm}^3$ .

16. Use of the aluminoborosilicate glass according to

Claim 2 as substrate glass in display technology.

17. Use of the aluminoborosilicate glass according to Claim 2 as substrate glass in thin-film photovoltaics.

18. The aluminoborosilicate glass according to Claim 3, characterized in that the glass comprises more than 8% by weight of  $B_2O_3$ .

19. The aluminoborosilicate glass according to Claim 3, characterized in that it additionally comprises:

$ZrO_2$	0 - 2
$TiO_2$	0 - 2
with $ZrO_2 + TiO_2$	0 - 2
$As_2O_3$	0 - 1.5
$Sb_2O_3$	0 - 1.5
$SnO_2$	0 - 1.5
$CeO_2$	0 - 1.5
$Cl^-$	0 - 1.5
$F^-$	0 - 1.5
$SO_4^{2-}$	0 - 1.5
with $As_2O_3 + Sb_2O_3 + SnO_2 + CeO_2$ + $Cl^- + F^- + SO_4^{2-}$	0 - 1.5.

20. The aluminoborosilicate glass according to Claim 3, characterized in that the glass is free of arsenic oxide and antimony oxide, apart from unavoidable impurities, and that it can be produced in a float plant.--

REMARKS

This Preliminary Amendment is being submitted in order to place the present application in a better condition for examination and to remove the multiple dependencies from the claims. Care has been taken to avoid the introduction of new matter. None of the changes submitted in this Preliminary Amendment are to be construed as having any effect on the scope of the subject matter being claimed, as they are merely being presented for clarification purposes, as stated above. All of the changes made in this Preliminary Amendment are made without prejudice, so that the matter deleted may be reintroduced as necessary for prosecution of the application.

Summary and Conclusion:

Attached hereto is a marked-up version of the changes made to the specification and/or claims by the current amendment. The attached page is captioned "MARKED-UP VERSION OF THE SPECIFICATION/CLAIMS".

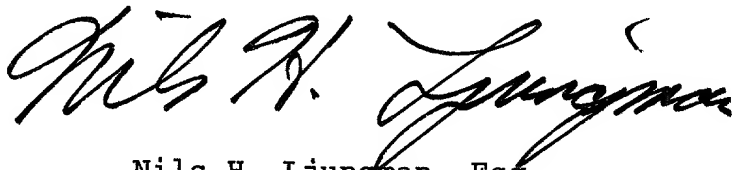
It is submitted that Applicants have provided a new and unique ALKALI-FREE ALUMINOBOROSILICATE GLASS, AND USES THEREOF. It is submitted that the claims, as amended, as now presented, are fully distinguishable over the prior art. Therefore, it is requested that a Notice of Allowance be issued at an early date.

If mailed, I, the person signing this certification below, hereby certify that this correspondence is being deposited with

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the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on the date indicated in the certification of mailing on the transmittal letter sent herewith, or if facsimile transmitted, I, the person signing this certification below, hereby certify that this paper is being facsimile transmitted to the United States Patent and Trademark Office on the date indicated in the certification of facsimile transmission on the transmittal letter which is being facsimile transmitted herewith.

Respectfully submitted,



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MARKED-UP VERSION OF THE SPECIFICATION/CLAIMS

In the claims:

Claims 4-10 have been amended, without prejudice, as follows:

4. (Amended) The aluminoborosilicate glass according to Claim 1 [or 2], characterized in that it comprises more than 18% by weight, preferably at least 20.5% by weight, particularly preferably at least 21% by weight, of  $\text{Al}_2\text{O}_3$ .

5. (Amended) The aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 4], characterized in that the glass comprises more than 8% by weight of  $\text{B}_2\text{O}_3$ .

6. (Amended) The aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 5], characterized in that it additionally comprises:

$\text{ZrO}_2$	0 - 2
$\text{TiO}_2$	0 - 2
with $\text{ZrO}_2 + \text{TiO}_2$	0 - 2
$\text{As}_2\text{O}_3$	0 - 1.5
$\text{Sb}_2\text{O}_3$	0 - 1.5
$\text{SnO}_2$	0 - 1.5
$\text{CeO}_2$	0 - 1.5
$\text{Cl}^-$	0 - 1.5
$\text{F}^-$	0 - 1.5
$\text{SO}_4^{2-}$	0 - 1.5
with $\text{As}_2\text{O}_3 + \text{Sb}_2\text{O}_3 + \text{SnO}_2 + \text{CeO}_2$	

+ Cl<sup>-</sup>+ F<sup>-</sup>+ SO<sub>4</sub><sup>2-</sup>

0 - 1.5.

7. (Amended) The aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 6], characterized in that the glass is free of arsenic oxide and antimony oxide, apart from unavoidable impurities, and that it can be produced in a float plant.

8. (Amended) The aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 7], which has a coefficient of thermal expansion  $\alpha_{20/300}$  of between  $2.8 \times 10^{-6}/K$  and  $3.6 \times 10^{-6}/K$ , a glass transition temperature  $T_g$  of  $> 700^\circ C$  and a density  $\rho$  of  $< 2.600 \text{ g/cm}^3$ .

9. (Amended) Use of the aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 8] as substrate glass in display technology.

10. (Amended) Use of the aluminoborosilicate glass according to [at least one of Claims] Claim 1 [to 8] as substrate glass in thin-film photovoltaics.